

JDEMSOC Vision and Goals for FY10

The scope of our work consists of the tasks indicated in this document. Our priority for FY10 is to work on slitless spectroscopy and NIR calibration workflows. Work on the optical imaging workflow is a stretch goal for FY10. Goals for FY11 and beyond will help us determine budget estimates for next fiscal year.

Develop slitless spectroscopy simulations and data processing for JDEM

In the current mission design, slitless spectroscopy is the most challenging aspect of JDEM science operations. By developing a design for slitless spectroscopy data processing, we will have solved the most challenging aspect of JDEM science operations. This should be a powerful argument for locating the SOC at Fermilab and for playing a significant role in JDEM science operations.

Simulations are needed to develop a design for slitless spectroscopy data processing. The deliverable for this task consists of generating simulated images for slitless spectroscopy.

Vision - For FY10 we will determine the essential features of a slitless spectroscopy data processing workflow for JDEM.

Goal(s) -

- Create realistic input catalogs with proper H-alpha fluxes. (FY10)
- Simulate spectroscopic images including cosmic rays with idealized galaxy shapes. (FY10)
- Verify that reduced data are in agreement with input data. (FY10)

- Perform non-optimal extractions for multi-roll data sets. (FY10)
- Simulate detector defects and artifacts. (FY11)
- Simulate spectroscopic images including cosmic rays with realistic galaxy shapes. (FY11)

Develop a prototype workflow for slitless spectroscopy and NIR processing

Slitless spectroscopy and NIR direct image processing have workflow participants that are common to both types of data processing. The goal of this task is to develop a prototype workflow with an emphasis on software infrastructure. By working on the prototype we will identify algorithms needed for the workflow and develop applications based on these algorithms. We will substitute “dummy” applications for workflow participants that we are unable to develop this fiscal year due to time constraints. The workflow will need access to a database, which will be developed as part of our FY10 effort.

Vision - By the end of FY10 we will have a prototype that implements a workflow for slitless spectroscopy and NIR direct image processing.

Goal(s) -

- Specify the workflow for slitless spectroscopy and NIR direct image processing. (FY10)
- Instantiate the workflow. Use “dummy” applications when necessary. (FY10)
- Develop a database to store data and support the workflow system. (FY10)

Develop workflows for EGSE demonstrator

LBNL and SLAC are developing the EGSE demonstrator. One of our roles for this fiscal year is to develop prototype workflows for the generation of calibrations based on darks and flats generated by the EGSE demonstrator. A second role of ours is to demonstrate a science image calibration

workflow based on examples of EGSE point source images (simulated star observations provided as FITS files.)

Vision - At this time we do not know what LBNL needs for the EGSE.

Develop requirements management capabilities

We will work with the DOORS requirements management software to develop expertise in the use of this software for JDEM. Requirements will be developed for the QuIDS quality control software and for other parts of the slitless spectroscopy and NIR demonstration system. We will use DOORS to track these requirements.

Vision - We manage all of our JDEM requirements using DOORS.

Goal(s) -

- Develop QuIDS requirements and manage them using DOORS. (FY10)
- Manage all other requirements for the demonstration system using DOORS. (FY10)

Investigate DDS for quality control

We are working with Tech-X to develop QuIDS for quality control. Tech-X received a Phase 1 SBIR grant from DOE to develop a system based on DDS. The goals of this effort are described in the QuIDS ConOps document. We are considering collaborating with Tech-X on a Phase 2 SBIR proposal. There are alternatives to working with Tech-X. For example, there is DDS expertise at Vanderbilt University, and we have developed DDS expertise at Fermilab so that we might be able to develop QuIDS without having to rely on Tech-X.

Vision - We will develop a DDS test system to evaluate performance and ease-of-use of DDS.

Goal(s) -

- See QuIDS and DDS goals described in the QuIDS ConOps document. (FY10 and beyond)

Investigate workflow management and provenance tracking

For JDEM we are interested in a workflow management system that will simplify specification and execution of workflows. Ideally, the system will also record provenance and other metadata involved in the execution of the workflow.

Vision - We will provide a workflow engine for JDEM, workflow configuration, as well as provenance record formats and ways of generating provenance.

Goal(s) -

- Evaluate the Kepler workflow system as the workflow engine. (FY10)
- Collaborate with JWST, LSST and NOAO on evaluating other workflow systems. (FY10)
- Integrate slitless spectroscopy and NIR processing functions into the workflow tools. (FY10)
- Collect requirements needed for JDEM workflows. (FY10)

Investigate databases for JDEM

At this time we do not have a good understanding of the database needs for JDEM. R&D on large-scale databases is one area that could turn out to be needed for JDEM. New database products for high-performance large-scale databases are available. Our goal is to support the database needs for slitless spectroscopy and NIR direct imaging while investigating some of these new products. Our primary target for these investigations is the JDEM SOC.

Vision - We will understand the database needs for the JDEM SOC.

Goal(s) -

- Develop database for slitless spectroscopy data processing. (FY10)

- Develop database for NIR direct image processing. (FY10)
- Determine capabilities of Greenplum database software. (FY10)
- Determine database needs for JDEM SOC operations. (FY11)